

### Application

## High Viscosity Fuels

**Targets:** Cement manufacturers, rotary kilns and calciners for cement, lime, alumina, minerals, power plants, engines manufacturers, energy companies, utilities, furnaces, boilers, fire heaters, large engines

### Application

High viscosity fuels are products generating combustion from other industries residues and are used for economic reasons. They can have diverse origins: distillation residues, animal fats... Variations within high viscosity fuels are commonplace considering their origins and additives. With viscosities around 3,000 centistokes at 100°C / 212°F, these products are usually solid at room temperature and liquid at their working temperature.

High viscosity fuels are used for energy production, industrial and central district heating, and manufacturing companies like cement manufacturers, sugar refineries, and paper mills. These products can be used as the main fuel or as a backup fuel, and fuel oil grade selection for a particular application is generally based on availability and economic factors including fuel price, clean air requirements, preheating / handling costs, and equipment cost.

Non-homogeneity of high viscosity fuels is the first major point to address in order to assure steady combustion processes. HVF, without a viscometer, cannot be burned due to the vast non-homogeneities. With HVF, three parameters must be regulated: pressure, fuel viscosity, and injectors. **Viscosity control before the injection is indispensable** and implies heating the HVF. Some industries perform density controls, yet this value is not of extraordinary value regarding combustion performance.

### Challenges

Burning high viscosity fuels presents problems such as:

- Non homogeneity
- Poor injection

Causing:

- Inaccurate combustion
- Fuel over-consumption
- Stack emissions increase
- **Frequent maintenance operations**
- Manufacturing downtime

**The need for viscosity control is crucial.**

## Solution

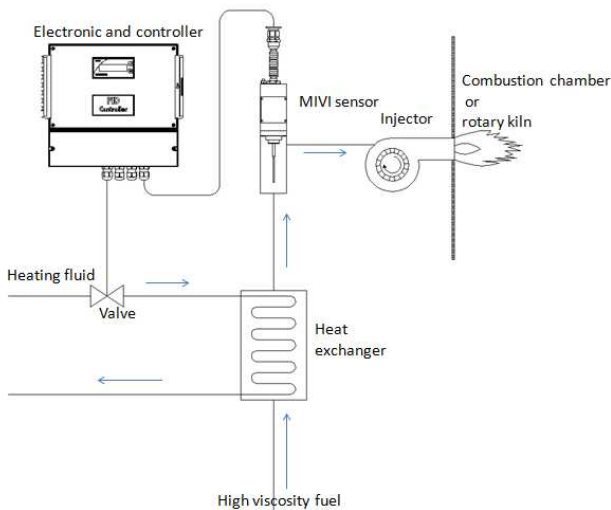
The installation of a vibrating inline process viscometer – **Sofraser MIVI sensor** - and associated electronic controller allow the high viscosity fuel to reach the correct viscosity when heated and they maintain stability during the combustion process which allows consistent atomization.

### Installation

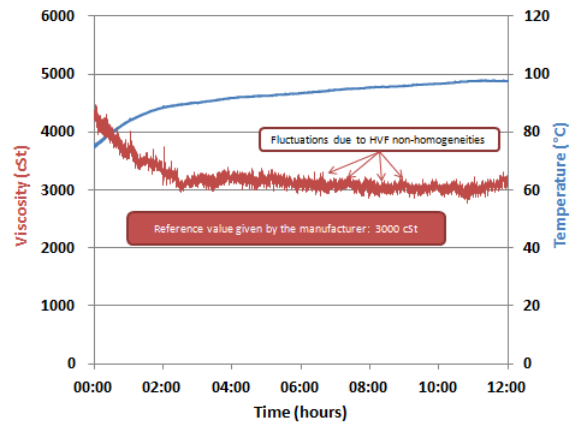
The MIVI inline process viscometer:

- is easily fitted at the heater outlet.
- continuously delivers viscosity and temperature information to the electronic controller
- the controller instantly assures the correct, constant, constant in-line viscosity at the outlet by activating the heater component (steam or hot water valve, for example) and regulates changes in viscosity

### Operation diagram



### Viscosity records on a rotary kiln installation at a cement manufacturing site



### Onsite installation



### Key product characteristics

- Large viscosity ranges up to 1,000,000 cP
- Robust over in time, no moving parts, no maintenance
- No drift in time
- Easy to clean, uncomplicated access to wetted part
- Large working temperature range
- Options for varying oil flow rates
- Ex-proof agreements (ATEX, FM) if required
- Electronic controller can include high and low viscosity alarms and / or temperature alarms, improving the fail-safe operation